

Serial No. 10/700,500

ASA-350-07

AMENDMENTS TO THE CLAIMS

1-22. (Canceled)

23. (Withdrawn) A magnetic apparatus comprising:
a perpendicular magnetic recording medium; and
a magnetic head including a recording element and a
reproducing element,

wherein said magneto-resistance element has a first non-magnetic metal layer, a second non-magnetic metal layer, and a magneto-resistance effect film formed between the first non-magnetic metal layer and the second non-magnetic metal layer,

said magneto-resistance effect film includes a first ferromagnetic layer, a second ferromagnetic layer, and an intermediate insulating layer formed between the first ferromagnetic layer and the second ferromagnetic layer, and

said magneto-resistance effect film is arranged so that a tunnel current flows between the first ferromagnetic layer and the second ferromagnetic layer through the intermediate insulating layer.

24. (Withdrawn) A magnetic apparatus according to claim 23, wherein a magnetization direction of said first

Serial No. 10/700,500

ASA-350-07

ferromagnetic layer changes in the presence of a changing external magnetic field.

25. (Withdrawn) A magnetic apparatus according to claim 23, wherein said perpendicular magnetic recording medium has a perpendicular magnetic recording layer comprising Co-Cr.

26. (Withdrawn) A magnetic apparatus according to claim 23, wherein a coercive force of the first ferromagnetic layer is smaller than that of the second ferromagnetic layer.

27. (Currently amended) A magnetic apparatus,
comprising:

a perpendicular magnetic recording medium; and

a magnetic head including ~~a recording element and a~~
reproducing element arranged to perform reproduction from the
perpendicular magnetic recording medium,

wherein said reproducing element has a magnetic-
resistance element ~~has~~ including a first non-magnetic metal
layer, a second non-magnetic metal layer, and a magneto-
resistance effect film formed between the first non-magnetic
metal layer and the second non-magnetic metal layer,

Serial No. 10/700,500

ASA-350-07

said magneto-resistance effect film includes a first ferromagnetic layer, a second ferromagnetic layer, an intermediate insulating layer formed between the first ferromagnetic layer and the second ferromagnetic layer, and an anti-ferromagnetic layer formed between the second ferromagnetic layer and the second non-magnetic metal layer, and

said magneto-resistance effect film is arranged so that a tunnel current flows between the first ferromagnetic layer and the second ferromagnetic layer through the intermediate insulating layer.

28. (Previously presented) A magnetic apparatus according to claim 27, wherein a magnetization direction of said first ferromagnetic layer changes in the presence of a changing external magnetic field.

29. (Previously presented) A magnetic apparatus according to claim 27, wherein said perpendicular magnetic recording medium has a perpendicular magnetic recording layer comprising Co-Cr.

Serial No. 10/700,500

ASA-350-07

30. (Previously Presented) A magnetic apparatus according to claim 27, wherein a magnetization direction of said second ferromagnetic layer is fixed by the anti-ferromagnetic layer which applies a bias magnetic field to the second ferromagnetic layer.

31. (New) In a magnetic apparatus of the type having a perpendicular magnetic recording medium and a magnetic head arranged to perform reproduction from the perpendicular magnetic recording medium, the improvement wherein:

the magnetic head includes a reproducing element,

wherein said reproducing element has a magnetic-resistance element including a first non-magnetic metal layer, a second non-magnetic metal layer, and a magneto-resistance effect film formed between the first non-magnetic metal layer and the second non-magnetic metal layer,

said magneto-resistance effect film includes a first ferromagnetic layer, a second ferromagnetic layer, an intermediate insulating layer formed between the first ferromagnetic layer and the second ferromagnetic layer, and an anti-ferromagnetic layer formed between the second ferromagnetic layer and the second non-magnetic metal layer, and

Serial No. 10/700,500

ASA-350-07

said magneto-resistance effect film is arranged so that a tunnel current flows between the first ferromagnetic layer and the second ferromagnetic layer through the intermediate insulating layer.

32. (New) A magnetic apparatus according to claim 31, wherein a magnetization direction of said first ferromagnetic layer changes in the presence of a changing external magnetic field.

33. (New) A magnetic apparatus according to claim 31, wherein a magnetization direction of said second ferromagnetic layer is fixed by the anti-ferromagnetic layer which applies a bias magnetic field to the second ferromagnetic layer.